UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 18506

CSAH NO. 31

OVER THE

RABBIT LAKE

DISTRICT 3 – CROW WING COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 18506, the North and South Abutments, were found to be in good condition with no defects of structural significance. The timber bents exhibited very minor checking and there was some light to moderate corrosion on the steel sheeting backwalls and wingwalls below the waterline. The channel bottom around the substructure units consisted of silty sand, which appeared well established and stable with no evidence of significant scour observed.

INSPECTION FINDINGS:

(A) Very minor checking generally with widths of less than 1/8 inch was observed on all of the timber piles.

(B) The steel sheeting exhibited coating failure, surface corrosion, and minor delaminations (rust scale) from 2 feet above the waterline to 0.5 feet below the waterline (generally 50-100 percent coverage with 1/32 inch deep estimated section loss). Below 0.5 feet below the waterline, the sheeting exhibited rust nodules with up to 1/16 inch deep pitting (generally on less than 5 percent of the surface area).

RECOMMENDATIONS:

(A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 18506

Feature Crossed: Rabbit Lake

Feature Carried: CSAH No. 31

Location: District 3 – Crow Wing County

Bridge Description: The bridge superstructure consists of one span of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two timber pile abutments. The abutments consist of timber piles with a timber pile cap and cross bracing. The backwall and wingwalls of each abutment consist of steel sheeting.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 15, 2007

Weather Conditions: Partly Cloudy, 48° F

Underwater Visibility: 5.0 feet

Waterway Velocity: Negligible / None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: North and South Abutments.

General Shape: Each abutment consists of five timber piles interconnected with timber cross bracing and a timber pile cap. The timber piles are in front of steel sheet piles which form the backwall and two skewed wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 16.0 feet.

4. WATERLINE DATUM

Water Level Reference: The top of pier cap on the west end of the North Abutment.

Water Surface: The waterline was approximately 7.3 feet below reference.
Assumed Waterline Elevation = 92.7

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code J/02

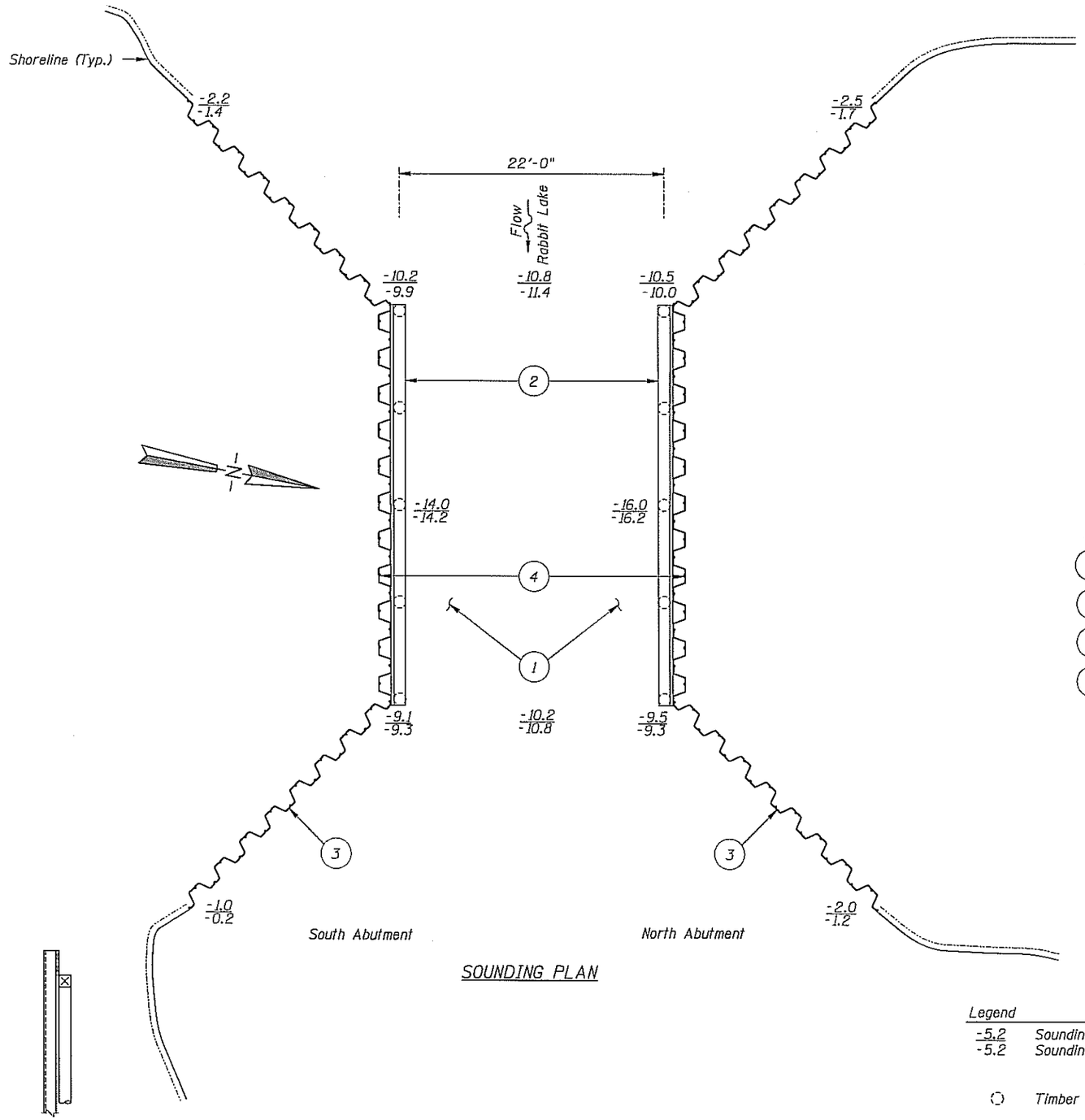
Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____Yes X No

Photograph 1. Overall View of the Structure, Looking East.

Photograph 2. View of South Abutment, Looking Southeast.

Photograph 3. View of North Abutment, Looking Northeast.



SOUNDING PLAN

TYPICAL END VIEW OF SOUTH ABUTMENT
(N. Abutment Opp. Hand)

GENERAL NOTES:

1. The North and South Abutments were inspected underwater.
2. At the time of inspection on October 15, 2007, the waterline was located approximately 7.3 feet below the top of the pile cap at the upstream end of the North Abutment. Since insufficient bridge elevation information was available, a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 92.7.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at the mid point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom consisted of silty sand with 2 to 4 inches of probe rod penetration.

(2) The timber members exhibited very minor checking up to 1/8 inch wide.

(3) Light aquatic growth was observed on the steel sheeting below the waterline.

(4) The steel sheeting exhibited coating failure and surface corrosion on 50 to 100 percent of the surface area from 2 feet above to 6 inches below the waterline with minor delaminations and section loss of up to 1/32 inch in depth. From 6 inches below the waterline to the channel bottom, the steel sheeting exhibited rust nodules with up to 1/16-inch-deep pitting on less than 5 percent of the surface area.

Legend

-5.2	Sounding Depth (10/15/07)
-5.2	Sounding Depth (9/26/02)
○	Timber Pile

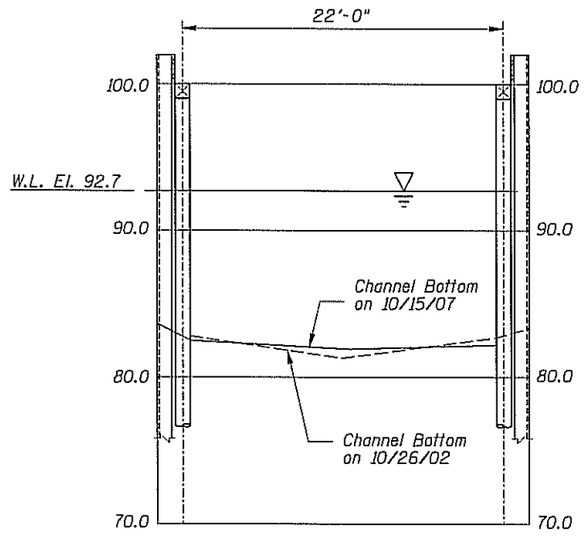
Note:
All soundings based on 2007 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

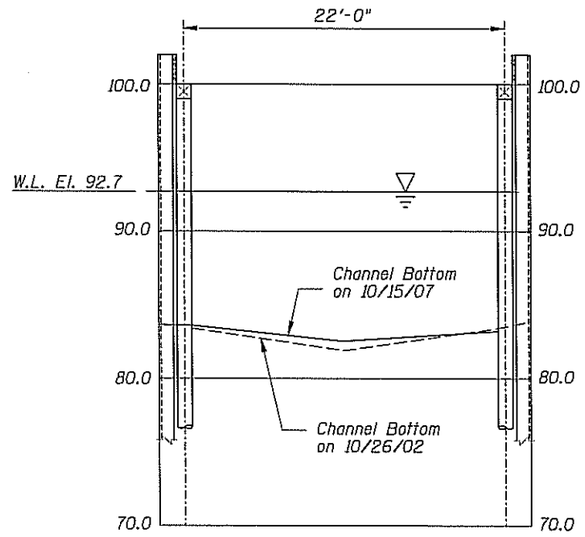
STRUCTURE NO. 18506
OVER RABBIT LAKE
DISTRICT 3, CROW WING COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: MDK	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-6100 www.collinsengr.com	Date: OCT. 2007
Checked By: DGS		Scale: NTS
Code: 522118506		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 18506
OVER RABBIT LAKE
DISTRICT 3, CROW WING COUNTY

UPSTREAM AND DOWNSTREAM
FASCIA PROFILES

Drawn By: MDK	COLLINS ENGINEERS, INC. 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: DGS		Scale: 1"=10'
Code: 522118506		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 15, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 18506 WEATHER: Partly Cloudy, 48° F

WATERWAY CROSSED: Rabbit Lake

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Probe Rod, Lead Line, Sounding Pole, Scraper, Camera

TIME IN WATER: 10:45 a.m.

TIME OUT OF WATER: 11:15 a.m.

WATERWAY DATA: VELOCITY Negligible / None

VISIBILITY 5.0 feet

DEPTH 16.0 feet maximum at North Abutment

ELEMENTS INSPECTED: North and South Abutments

REMARKS: Overall, the timber piling and bracing of the North and South Abutments was in good condition with no significant deterioration. In addition, the steel sheeting backwall was also in overall good condition with mostly minor deterioration. All timber members exhibited very minor checking and there was light to moderate corrosion on the steel sheeting below the waterline. The steel sheeting exhibited coating failure, surface corrosion, and minor delaminations from 2 feet above the waterline to 0.5 feet below the waterline. Below 0.5 feet below the waterline the sheeting exhibited rust nodules with up to 1/16 inch deep pitting. There was no notable scour or other channel bottom deficiencies.

FURTHER ACTION NEEDED: _____ YES X NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 18506
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Rabbit Lake

INSPECTION DATE October 15, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (STEEL SHEETING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	North Abutment	16.0’	7	N	N	9	7	7	8	N	N	N	8	N	7	7	7	N	N
	South Abutment	14.0’	7	N	N	9	7	7	8	N	N	N	8	N	7	7	7	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piling and bracing of the North and South Abutments was in good condition with no significant deterioration. In addition, the steel sheeting backwall was also in overall good condition with mostly minor deterioration. All timber members exhibited very minor checking and there was light to moderate corrosion on the steel sheeting below the waterline. The steel sheeting exhibited coating failure, surface corrosion, and minor delaminations from 2 feet above the waterline to 0.5 feet below the waterline. Below 0.5 feet below the waterline the sheeting exhibited rust nodules with up to 1/16 inch deep pitting. There was no notable scour or other channel bottom deficiencies.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.